Stapleton Development Corporation

Black-Tailed Prairie Dog Management Plan

January 12, 2000

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In addition to Dennis Piper and the Stakeholders Group, Guthrie and Associates appreciate the interest and concern expressed by neighbors, wildlife advocates and members of SDC's Parks and Open Space Advisory Group as this plan was developed. We thank them for their review. We also appreciate information and feedback from Steve Dougherty and Aleta Powers, ERO Resources, Inc., Dave Seery, Rocky Mountain Arsenal National Wildlife Refuge, Dr. Carl Mackey, MK Environmental Service, Tim Rood and Roger Hodges of Calthrope Associates, and Melissa McCulloch-Linn formerly of Stapleton Development Corporation.

Executive Summary

The Stapleton site contains a mosaic of former airport facilities and remnant natural areas within its 4,700 acres (approximate). Black-tailed prairie dogs *(Cynomys ludovicianus)* currently inhabit areas of the site where residential and commercial development is planned. The Black-tailed Prairie Dog Management Plan for Stapleton Development Corporation (SDC) is intended as a guide to manage black-tailed prairie dogs and their habitat on the site, and is designed to coincide with overall goals, objectives and design concepts of the development plan.

The goal of prairie dog management at SDC is *to manage and conserve prairie dogs and their habitat on the Stapleton site to the extent possible in a long-term, ecologically sustainable manner that minimizes conflicts between prairie dogs and human uses of the site.* Basic principles of conservation biology were considered in the development of the plan, which will increase the potential for long-term sustainability of prairie dog habitat and populations at SDC. A habitat suitability model was developed to determine the location of area appropriate for prairie dog habitat. The analysis resulted in three potential conservation areas, which have unique opportunities and constraints.

1. The **I-70/I-270 Interchange** site has the fewest conflicts with the current development plan. This 95-acre area is located on the west side of the Stapleton property, just north of I-70 and bordered by the Quebec Street / I-70 / I-270 interchange. A ten-acre active colony is present southwest of this proposed prairie dog conservation area. Burrowing owls inhabited this colony in 1999.

2. **Section 10** offers the best ecological setting for prairie dogs on the site. This 58-acre site in the northwest quarter of Section 10 is bordered by the Rocky Mountain Arsenal. The management challenge will be to confine prairie dogs to designated locations and to incorporate physical barriers into the landscaping plan for the areas bordering the conservation area. A sandhill prairie conservation area encompassing the only known native sandhill prairie remaining on SDC is proposed for the southeast portion of Section 10.

3. The **Bluff Lake** site is an opportunity to focus on habitat diversity and biological productivity in an area with an active and community-based educational program. This 57-acre site in the southeast corner of the SDC property is part of Development District III and is currently zoned residential. Establishment of a prairie dog conservation area beyond the 15 acres of designated open space would require a modification of the current zoning.

Managing prairie dogs in the urban setting at SDC will be complex. Guidelines for designing prairie dog conservation areas and maintaining them are included. A decision-making hierarchy for managing prairie dog populations (including relocation and extermination) was developed which sets out standards and best management practices for relocation.

Section I: Introduction

This plan describes the management of black-tailed prairie dogs *(Cynomys ludovicianus)* at the former Stapleton airport site. The Stapleton International Airport site contains a mosaic of former airport facilities and remnant natural areas within its 4,700 acres (approximate). The Stapleton Development Corporation (SDC) is charged with guiding the redevelopment of the site over the next few decades. The Black-tailed Prairie Dog Management Plan for SDC is intended as a guide for the corporation in their efforts to manage prairie dogs and their habitat on the site.

Stapleton is located just northeast of the city of Denver (figure 1). The closure of the airport in 1995 marked the beginning of the largest urban redevelopment project in the city's history. The Stapleton Development Plan describes the framework for the redevelopment of the site over the next several decades. This prairie dog management plan was designed to coincide with overall development goals, objectives and design concepts of the development plan.

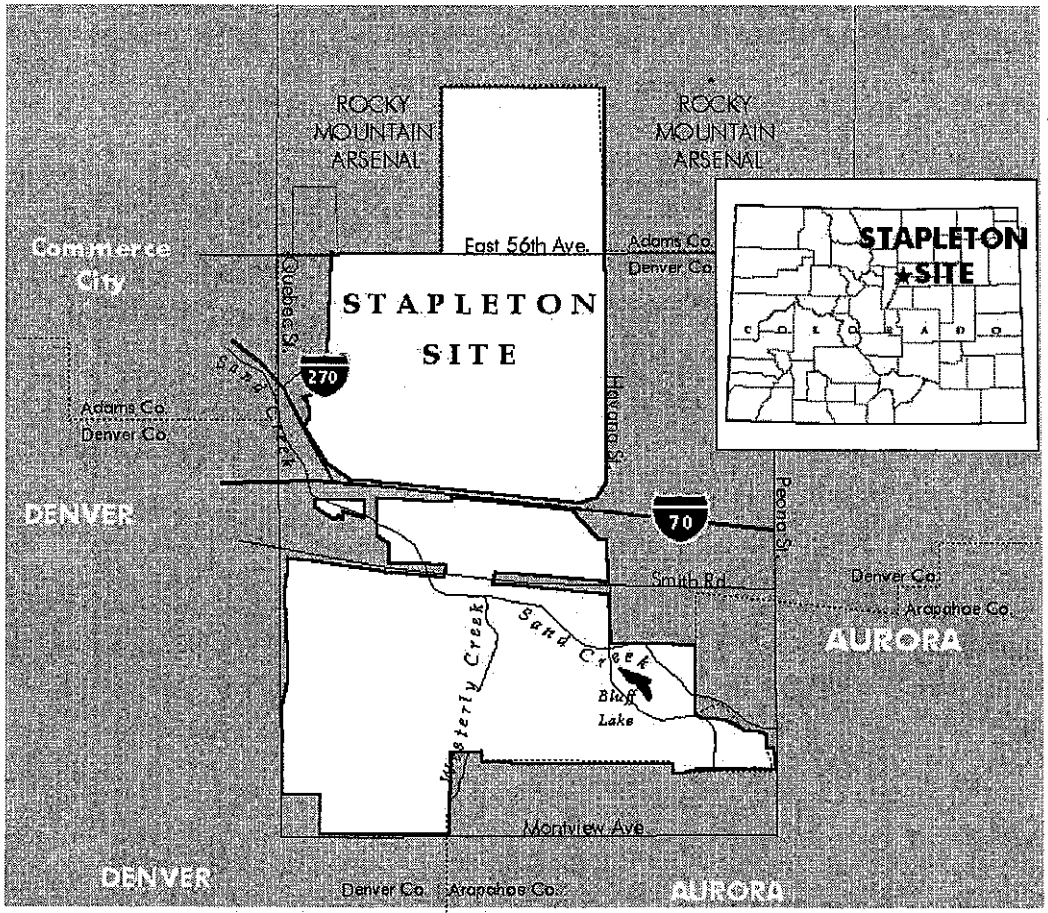


Figure 1: General location of the Stapleton site.

Setting

Stapleton is surprisingly rich in physical and ecological attributes that provide habitat for wildlife and have persisted throughout the years of airport use.

- Short and mixed grass prairie
- Bluff Lake and associated wetlands
- Two streams: Sand Creek and Westerly Creek
- Sandstone bluffs
- Sandhills

These features support a variety of wildlife. The northern sandhills portion of the site serves as range and feeding ground for birds of prey, prairie dog colonies and burrowing owls. The Sand Creek Corridor provides habitat for deer, fox and other animals.

Challenge and Opportunity

The management of prairie dogs on the old Stapleton Airport site presents both a challenge and an opportunity for SDC. The challenge is to manage the species in a manner consistent with the goals and objectives of the development plan as well as local, state and federal regulations. Prairie dogs currently inhabit areas of the site where residential and commercial development is planned. Preserving prairie dogs on the site in a sustainable manner will require long-term management. Although colonies of the species may be relocated to other areas of the site, a management plan is needed to address potential conflicts with prairie dogs and adjacent land uses.

The protection of prairie dogs and their habitat on the old Stapleton site also presents an outstanding opportunity for SDC. The presence and preservation of wildlife has far-reaching effects on the diversity and livability of an urban community by:

- Familiarizing local residents with the unique and distinct plants, animals and natural communities where they live.
- Providing opportunities to observe spectacular natural features, interesting behaviors and scenic vistas.

Goals and Objectives

The Goal of Prairie Dog Management at the Stapleton Development Corporation site is:

To manage and conserve prairie dogs and their habitat on the Stapleton site to the extent possible in a long-term, ecologically sustainable manner that minimizes conflicts between prairie dogs and human uses of the site.

One of the objectives of the Stapleton Development Plan is to provide an opportunity to restore the health of natural systems on site and make important regional connections to significant natural resources off site. The Black-tailed Prairie Dog Management Plan will contribute to that community objective by exploring opportunities for conservation and restoration of habitat on the site and in connection to adjacent significant natural systems. The Plan identifies areas suitable for prairie dog habitat and outlines methods for managing prairie dog populations on site.

The following objectives are identified as a means of achieving the overall management goal. The first four are addressed in the prairie dog management plan; the final two will be addressed by SDC subsequent to the management plan.

1. Develop acceptable options for addressing existing colonies.
2. Involve the community in the planning process.
3. Identify areas suitable for prairie dog habitat on the site.
4. Develop long-term habitat management policies.
5. Develop an implementation plan consistent with Stapleton redevelopment phasing.
6. Develop partnerships with other organizations and agencies that address prairie dog habitat conservation.

Background

Prairie dogs were once a widespread and common species of the shortgrass prairie. They are considered of unusual importance because prairie dogs have far-reaching ecological

effects upon the landscapes where they live. Burrowing and feeding by prairie dogs affects prairie ecosystems in a number of ways.

Factors that make the prairie dogs so important from an ecological perspective bring them into conflict with other land uses, especially agriculture and urban development. Conflicts, which have emerged between people and prairie dogs, include: plague epizootics, increased threats of soil loss through wind and water erosion, and the destruction of residential landscaping. Annual dispersal and colony expansion also present problems in confined urban situations where there is little room for expansion and movement of the colonies.

The early accounts of explorers, naturalists and animal control agents have been used to estimate that approximately 250,000,000 acres were occupied by prairie dogs at the turn of the century. Recent calculations suggest that prairie dog distribution has been reduced by approximately 98% over the past 95 years.

The western high plains have been dramatically modified by human activity over the past 150 years resulting in conflicts between prairie dogs and humans complicated by a variety of social and economic issues. Successful management strategies for the Stapleton site should include public education as well as biological tools.

Problem Statement

Although the prairie dog is a common sight in the short and mixed grass prairies along the Colorado Front Range, their populations are fast declining throughout their historical range. Black-tailed prairie dogs were once common and widespread throughout the short and mixed grass prairies of the plains. This is no longer the case. Population declines coincided with massive reduction of the bison herds in the 1800s as a result of market and recreational hunting. Around the turn of the century, government-sponsored prairie dog poisoning programs were initiated throughout the prairie dog's range.

Throughout the period of "animal damage control", hundreds of thousands of acres of the black-tailed prairie dog's range were converted from native grassland to agricultural and urban land uses. Most of the remaining acreage is comprised of small isolated prairie dog colonies.

The spread of plague through the central Great Plains has compounded the impact of habitat reduction, the near extinction of associated species, and intensive poisoning programs. Probably introduced to California from Asia in the early 1900's, plague has been found in wild rodent populations throughout Colorado's eastern plains. Although

prairie dogs are able to rapidly recolonize areas, decrease in population levels and subtle genetic effects resulting from frequent intense population reductions caused by plague may be occurring.

Resource managers and conservationists in the region have long recognized the importance of the prairie dog and issues surrounding its rapid decline. In 1998, the National Wildlife Federation petitioned the U.S. Fish and Wildlife Service (USFWS) to consider an emergency listing of the black-tailed prairie dog as a threatened species under the Federal Endangered Species Act. The USFWS denied the emergency listing but has not yet made a final determination about whether the species should be protected under the Act. A final determination is expected in early 2000.

The main factors affecting the range and numbers of the black-tailed prairie dog are:

- *the reduction in the extent of prairie dog colonies,*
- *agriculture and urbanization,*
- *fragmentation of remaining prairie dog colonies and;*
- *plague.*

Local Issues

The 4,700-acre Stapleton site is approximately six miles from downtown Denver. The site is bordered by Commerce City to the northwest, the Rocky Mountain Arsenal (RMA) to the north and northeast, and the city of Aurora to the southeast (figure 1). Approximately 225 acres of the Stapleton site are inhabited by prairie dogs. However, the Stapleton Development Plan identifies new commercial and residential development for most of these areas and does not specifically accommodate the existing colonies on any location throughout the site.

Assumptions

Given the regional and local issues with prairie dog protection, several assumptions were made in developing this plan:

- SDC accepts the principle that prairie dogs are an important part of the native fauna of certain grasslands of the Colorado piedmont and accommodations should be made to preserve the species and their habitat to the extent possible.

- Most, if not all, of the existing colonies are on areas slated for new development and will need to be relocated to other areas on the Stapleton site or to areas off-site or exterminated.

- 1,116 acres of land on the site will be developed and managed as open space and some of that land may be preserved as future prairie dog/grassland habitat.

- Prairie dog habitat preservation is limited by the Stapleton Development Plan. Those areas designated as open space and parks are the primary candidates for prairie dog conservation areas.

- Sustainability of prairie dog populations is a long-term goal of SDC and ecological principles should be used in the design, creation and management of prairie dog habitat.

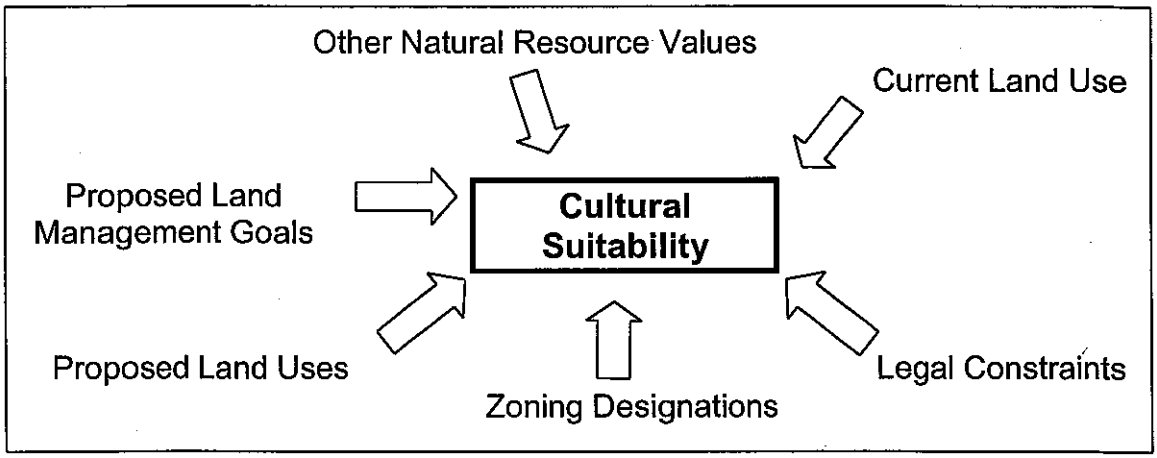
Section II: Analysis and Recommendations

Planning Principles

A primary focus of conservation biology is the development of strategies to save species from extinction across their range. Basic principles of conservation biology were considered in the development of the Black-tailed Prairie Dog Management Plan. Although SDC cannot address the larger issues of black-tailed prairie dog conservation, application of conservation biology principles increase the potential for long-term sustainability of prairie dog habitat and populations on the site. Appendix 1 contains a more detailed explanation of the principles and the methodology used in this study.

Habitat Assessment for Cultural and Ecological Suitability

A habitat suitability model was developed to determine the location of sites appropriate for prairie dog habitat. This approach considers physical, ecological, and cultural factors in determining the locations most suitable for prairie dog conservation. A site is analyzed by filtering out unsuitable areas based on site constraints.



Habitat suitability is controlled by both cultural and ecological factors. Cultural suitability refers to the likelihood that a given parcel of land can be used for grassland conservation and prairie dog habitat given the existing overlay of proposed land use, zoning designations, current land use, legal restrictions, other natural resource values, and the management goals of the owner.

The Stapleton Development Plan is used as the first filter for cultural suitability. Those areas that passed the first filter were evaluated for ecological suitability for grassland conservation and prairie dog habitat.

Proposed Conservation Areas

The analysis resulted in three potential conservation areas (figure 2). Each of the conservation areas has special opportunities and constraints.

1. The **I-70/I-270 Interchange** site has the fewest conflicts with the current development plan.

2. **Section 10** offers the best ecological setting for prairie dogs on the site.

3. The **Bluff Lake** site is an opportunity to focus on habitat diversity and biological productivity in an area with an active and community-based educational program.

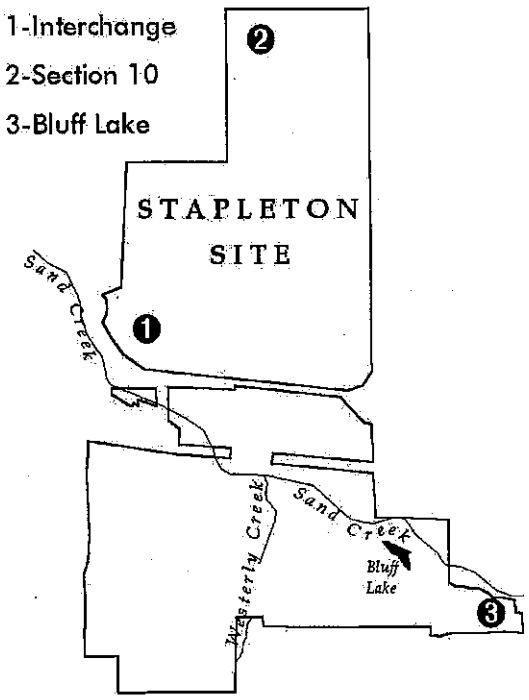


Figure 2: General locations of proposed conservation areas

I-70/I-270 Interchange Conservation Area

Location

This 95-acre proposed conservation area is located on the west side of the Stapleton property, just north of I-70 (figure 3). The western and south sides are bordered by the Quebec Street / I-70 / I-270 interchange. The area is bisected by Syracuse Street extended. An earthen berm and chain link security fences surround the former runway area adjacent to Syracuse Street.

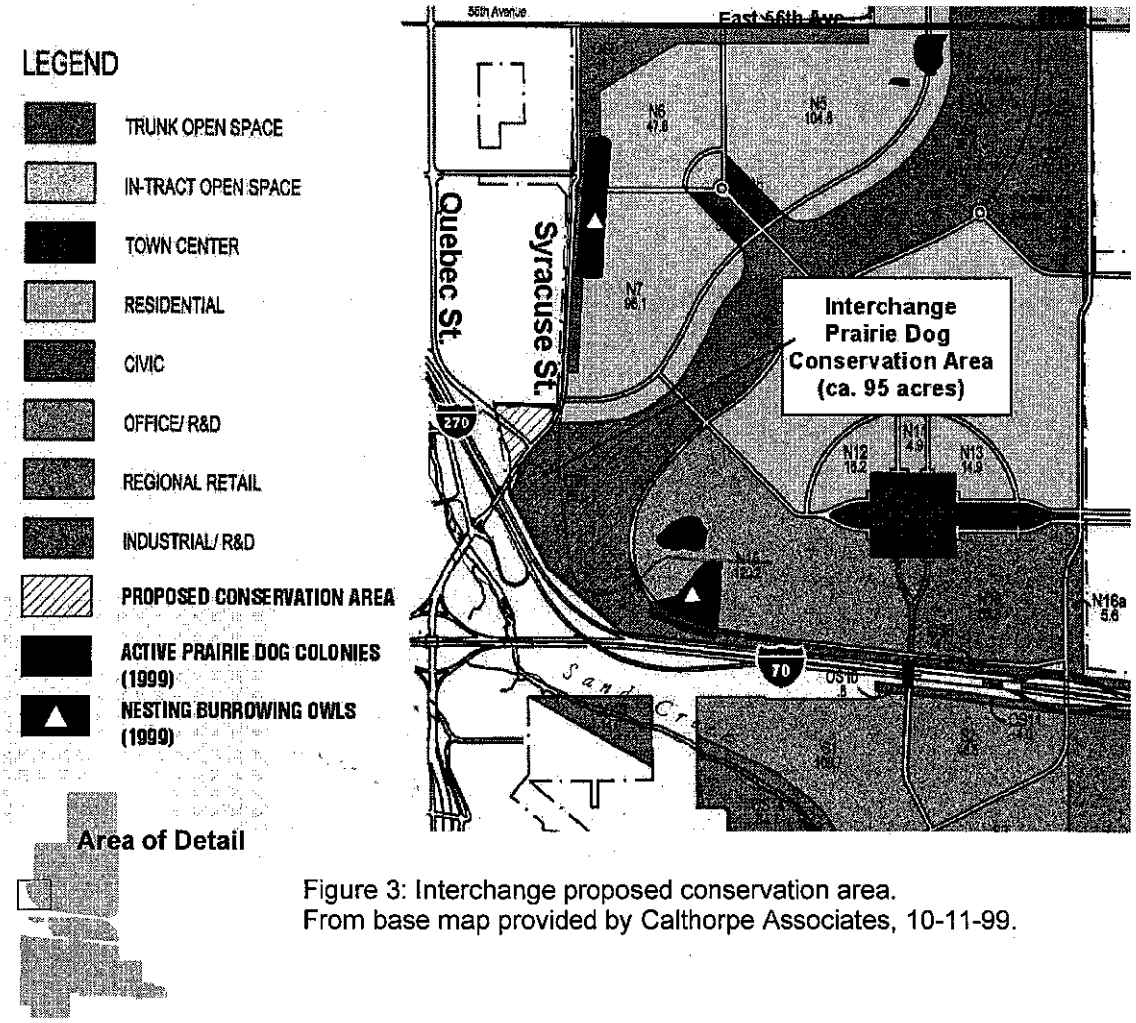


Figure 3: Interchange proposed conservation area.
From base map provided by Calthorpe Associates, 10-11-99.

Site Description

Weedy plants, mostly non-natives, dominate the vegetation of the proposed conservation area. Cheatgrass, bindweed and crested wheatgrass account for the majority of cover. Native plants found on the site include purple three awn, hairy golden aster and yucca. This weedy plant assemblage is probably the result of two major factors: highway construction and long-term prairie dog grazing. The area was probably disturbed during the construction of the interstate or the Quebec overpass and reclaimed with a seed mix dominated by crested wheatgrass.

It is likely that prairie dogs arrived during or soon after the reclamation and their populations spread across the area. Historic prairie dog activity was confirmed by the presence of many abandoned burrow entrances scattered across the site. Judging from the extent of decay and collapse, prairie dogs have been absent from most of the site for

the past three to five years. A ten-acre active colony is present southwest of this proposed prairie dog conservation area. Burrowing owls inhabited this colony in 1999.

There are few current human uses of the proposed conservation area. Landing lights were once located here, but all that remains are three small (10'x10') fenced concrete pads. An abandoned gravel road cuts through the southern portion of the area and a natural gas pipeline is located in the area west of the paved road. Despite low levels of human use, the site accumulates considerable wind-blown debris and litter from the adjacent highways. The site is not fenced from Syracuse Street, consequently there has been dumping of fill and other refuse along the roadside.

Adjacent Land Uses

An interstate right-of-way and four lane interstate highways lie to the west and south of the proposed conservation area. A vacant lot, used for temporary parking of tractor-trailers, is adjacent to the northern border on the west side of Syracuse Street. On the east side of this street, the conservation area borders SDC property designated as open space. Waste Management Inc. operates their Denver North facility on the east side of Verbena within the SDC property boundary.

The potential for conflicts between prairie dog conservation at this site and existing adjacent land uses are moderate. Prairie dog colonies will probably expand into interstate rights-of-way. This right-of-way is managed by the Colorado Department of Transportation (CDOT). It is unlikely that prairie dogs will successfully cross either I-70 or I-270. Some dispersal is possible into the parcel that lies between Quebec and I-270.

The proposed development plan (10/1999) shows residential zoning to the north and northeast of the conservation area and office/R&D zoning to the south and east (figure 3). A small portion of the proposed conservation area lies adjacent to lands designated as open space. The border with the residential area is relatively short (about 400 feet). The construction of visual barriers, such as landscaping and fencing, could reduce conflicts in this area. Conflicts along the 1000-foot boundary with the office/R&D will probably be more difficult to avoid.

Although a detailed site drainage plan is not currently available, representatives of Forest City have indicated that a detention basin may be constructed in this area. The location or extent of this structure has not yet been determined. Prairie dogs are known to inhabit areas that are seasonally flooded during the dry season.

Recommendations

- Identify the owner(s) of parcels bounding the conservation area, especially to the north (west of Syracuse Street).

- Consult adjacent landowners and managers regarding the establishment of the prairie dog conservation area. The success of this conservation area depends to a large degree upon the willingness of CDOT to allow colony expansion into the right-of-

way. Constructing and maintaining a visual barrier along the right-of-way would be impractical and expensive.

- Learn about the revegetation techniques used at the RMA to establish sustainable stands of non-weedy vegetation in prairie dog colonies. If appropriate, use these techniques to reclaim the vegetation of this prairie dog conservation area.

- Construct hunting perches in the conservation area to attract hawks and eagles.

- Work with Forest City to establish naturalistic barriers to colony expansion (water features, hedges, stone walls, etc.) between the proposed conservation area and adjacent residential and office/R&D zones.

- Discourage the dumping of fill and other refuse into the conservation area through fencing, signing and streetscape improvements.

- Consider relocating drainage basins in other zoning designations as a water feature or part of a park.

Section 10 Conservation Area

Location

This 58-acre proposed prairie dog conservation area is located in the northwest quarter of Section 10 (T3S, R67W). The Rocky Mountain Arsenal forms the boundary on the north and west (figure 4). A sandhill prairie conservation area is proposed for the southeast portion of Section 10, bordered by the Rocky Mountain Arsenal on the east and East 56th Avenue on the south (figure 4).

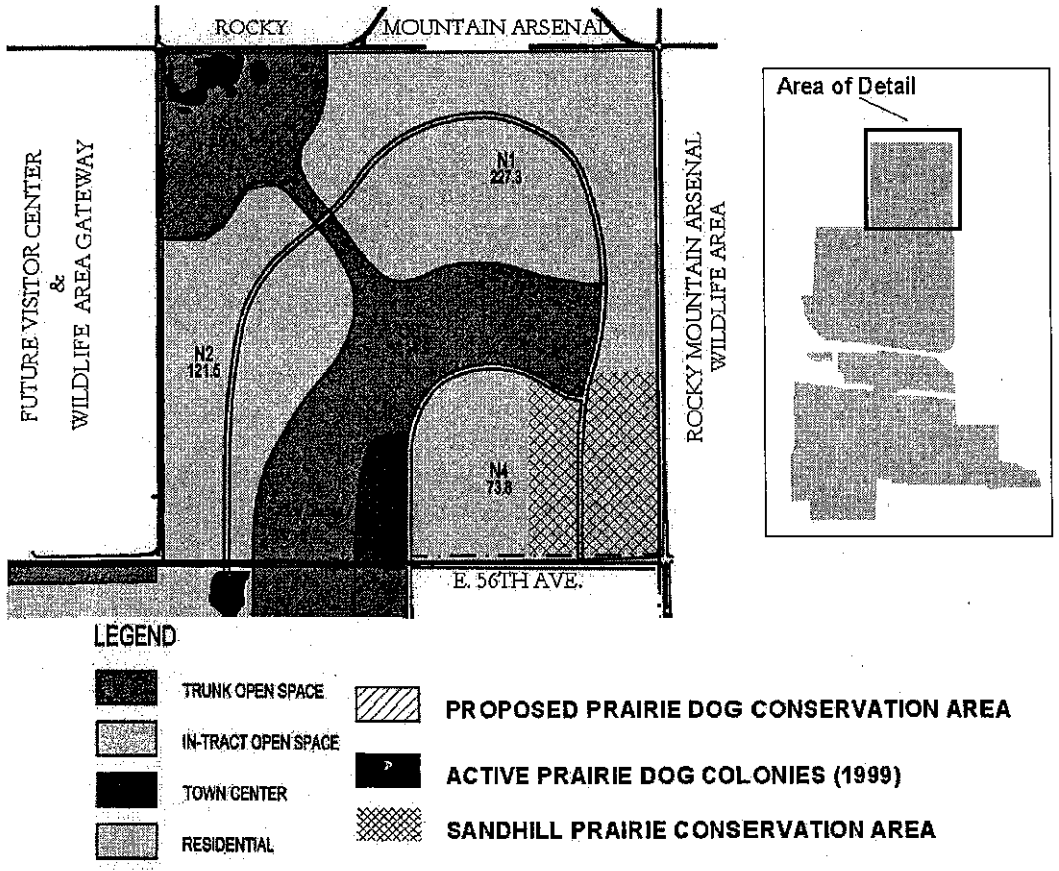


Figure 4: Section 10 proposed conservation area.
From base map provided by Calthorpe Associates, 10-11-99.

Site Description

Two dominant vegetation types and one minor type occur on this site. At RMA, vegetation adjacent to this conservation area is mapped primarily as native perennial grassland and weedy forbs and grasses with small areas of shrublands and succulents.

Dominant species in the sandy soils of the conservation area(s) may include: sand dropseed (*Sporobolus cryptandrus*), needle and thread (*Hesperostipa comata*), sand bluestem (*Andropogon hallii*), prairie sand reed (*Calomovilfa longifolia*), Indian ricegrass (*Stipa hymenoides*), buffalo grass *(Buchlo dactyloides*) and blue grama (*Chondrosum gracile*) (USFWS 1996). The areas mapped as weedy forbs and grasses are probably dominated by crested wheatgrass *(Agropyron cristatum*). This species was introduced from Eurasia for use in erosion control and has been used for decades to reclaim disturbed areas. Crested wheatgrass stands are often mixed with cheatgrass (*Anisantha tectorum*), sand dropseed and field bindweed (*Convulvulus arvense*). Shrubby areas are probably a mixture of sand sagebrush (*Oligosporus filifolius*), yucca (*Yucca glauca*) and rubber rabbitbrush (*Chrysothamnus nauseousus).*

The prairie dog conservation area was a little-used corner of the SDC site, with runways to the south and east. Field surveys in 1999 located active prairie dog colonies in the conservation area.

Proposed land uses for the site include residential, neighborhood commercial (town center), a public golf course (9 of 18 holes north of 56th Avenue), an open space corridor, and some neighborhood parks. In the meantime, a large portion of Section 10 is the site of concrete recycling operations as runways are removed. This activity will continue over the next six years. The operation is south and east of the proposed conservation site and covers much of what will become golf course in the future.

The only known native sandhill prairie remnant has been located in Section 10 by Dr. Carl Mackey of Morrison-Knudsen. Recent mapping by the RMA shows active burrows adjacent to the southeast corner of Section 10. Runway construction and operation were the dominant past human use of this area. A railroad spur serving the RMA crosses the area as well. Since the closing of the airport, this site has received very little use. All runways on site are scheduled for removal prior to site development. The runway removal efforts will seriously impact the native prairie remnant unless the area is clearly marked and/or fenced to keep heavy equipment off the conservation area.

Adjacent Land Uses

The Rocky Mountain Arsenal National Wildlife Refuge (RMA) borders the prairie dog conservation area on the north and prairie dogs can be expected to migrate between the two properties. A future visitor center for the RMA is planned for the property to the west of the conservation area (Section 9). Commerce City is planning to acquire and develop Section 9 for recreational use.

Directly east of the proposed sandhill prairie conservation area, Havana Street separates the site from the Rocky Mountain Arsenal National Wildlife Refuge. A refuge perimeter trail described in the RMA management plan will be located along that boundary, but probably on the east side of Havana Street. The southern edge of the prairie conservation

area is defined by 56th Avenue, which will be widened to a four-lane parkway when funding is available. South of 56th Avenue lies the Catellus industrial office park.

Potential for Conflict

The greatest potential for conflict, as in other areas of Stapleton, will be between prairie dog conservation and residential development—particularly given the proposed zoning as residential and the amount of shared boundaries. The boundary with the RMA should not be a conflict since managers at RMA have preliminarily indicated that they would welcome the designation of prairie dog conservation areas along their shared boundary with Stapleton. The management challenge remains how to confine prairie dogs to designated locations and to control their migration into areas where their presence is not wanted.

The type of development on Section 9 adjacent to the proposed prairie dog conservation area is uncertain at this time, but a wildlife area would be a compatible land use. Residential or traditional park development would pose the same potential for conflict as with other developed land uses.

The proposed sandhill prairie conservation area is the best remaining prairie remnant on the Stapleton site. The greatest potential for conflict is the development plan, which shows the area as residential development. The existing concrete recycling operation could negatively impact the prairie if it is not fenced and heavy equipment is allowed on the site. If the sandhill prairie conservation area is designated and preserved, the expansion of prairie dogs onto the site could degrade the native vegetation. The widening of 56th Avenue will include a separated bike path along the north side of the roadway that would adjoin the proposed sandhill prairie conservation area and precautions for limiting impacts to the prairie should be taken during the construction period.

Recommendations

- Revisit the proposed zoning of Section 10 to accommodate preservation of the remnant prairie on the site (the proposed sandhill prairie conservation area).

- Establish guidelines for protecting the remnant native prairie during the widening of 56th Avenue and the bike path construction, and from colonization by prairie dogs. These guidelines should include protection from disturbance as well as Best Management Practices to prevent the spread of weed seeds from the construction area during and after bike path construction.

- Protect the existing sandhill prairie site from disturbance by the concrete recycling operation by fencing the area and limiting access.

- Establish a formal written agreement with the RMA regarding cross-border management issues, including the establishment of a conservation area on the SDC site.

- Establish a formal written agreement with Commerce City regarding cross-border management issues.

- Incorporate physical barriers into the grading and landscaping plan for the areas bordering the prairie dog conservation area.

District III Development Area

Location

This 57-acre site is located in the southeast corner of the SDC property. The area is bordered to the south by 26th Avenue, to the east by Peoria Street, to the west by Moline Street and to the north by the SDC boundary (see figure 5). This site is part of Development District III.

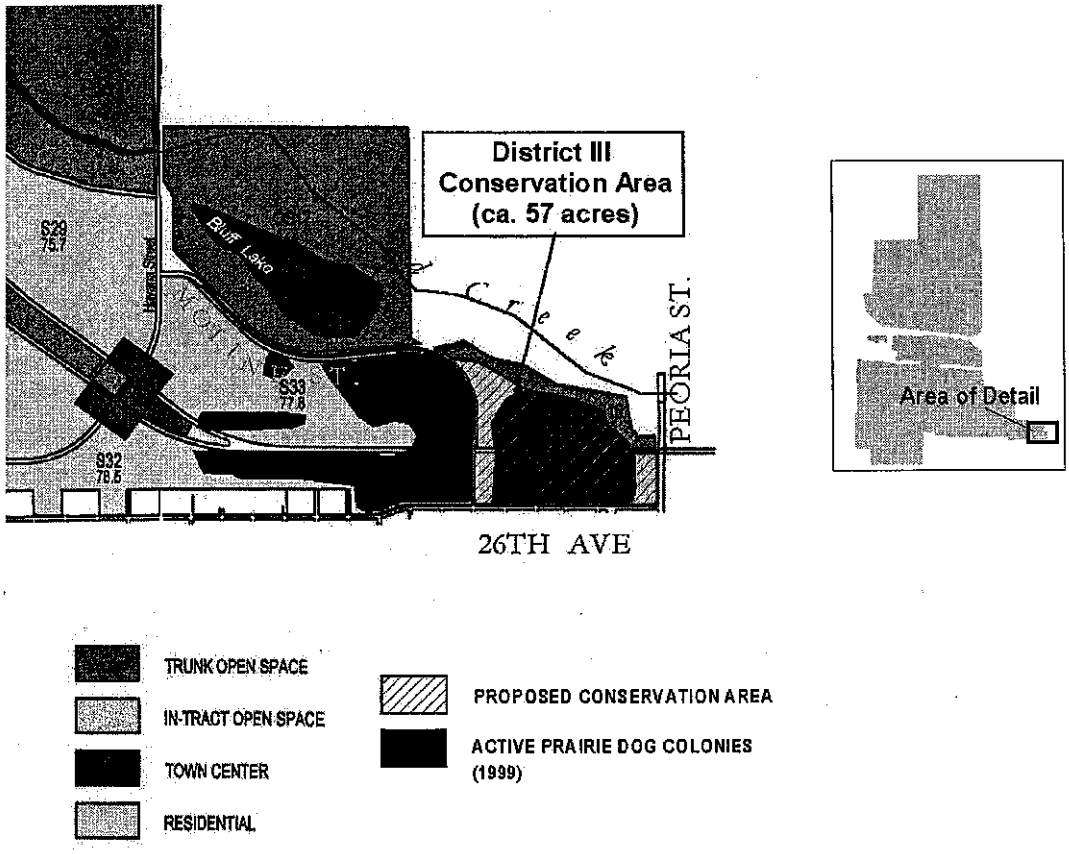


Figure 5: District III Development Area proposed conservation area.
From base map provided by Calthorpe Associates, 10-11-99.

Site Description

A detailed site review was not conducted. However, a cursory visual inspection revealed a disturbed landscape dominated by weedy exotic species. A 35-acre, active prairie dog colony occupies the site. Burrowing owls have been recorded from this area (ERO 1999). About 15 acres along the northern edge of the site are currently zoned as open space (figure 5). The landscape setting of this proposed conservation area is notably

diverse. The Friends of Bluff Lake are managing and protecting a landscape mosaic containing some of the most productive local ecosystems.

Adjacent Land Uses

Bluff Lake is a mosaic of open water, wetlands, riparian areas and steep sandy bluffs. Almost none of the 123-acre Bluff Lake site is ecologically suitable for prairie dogs. The small areas of grassland around the parking lot are too small to serve as conservation areas. The Friends of Bluff Lake have indicated interest in managing the parcel described here. The area is part of Development District III and is therefore culturally unsuitable habitat. The following brief analysis is being provided because of an excellent opportunity to manage this site as a prairie dog conservation area.

The site is southeast of the Bluff Lake natural area, its adjacent wetlands and a portion of Sand Creek and its riparian area. This is an extraordinary concentration of habitat diversity for a highly developed urban area. Such diverse and productive environments may attract and sustain species that would otherwise need considerably more acreage. When placed in context with other productive ecosystems, prairie dog colonies can help attract and maintain populations of predators such as hawks, eagles, fox and badgers. In urban areas, conservation of these species may depend upon protecting places like this where several productive and diverse habitat types converge.

The property to the north is owned by the city of Aurora and will be cooperatively managed by the Friends of Bluff Lake and Aurora Parks Department beginning in 2000. The Friends of Bluff Lake also manage a 123-acre area around Bluff Lake that is owned by the city of Denver. This organization has expressed an interest in managing the proposed conservation area because of its ecological and educational value. The remainder of Development District III, designated as low-density residential development, lies west of Moline. A residential neighborhood in the city of Aurora lies to the south of 26th Avenue.

Potential for Conflict

Peoria Street and 26th Avenue are busy streets during the day and are probably effective barriers to the dispersal of prairie dogs. No prairie dog activity was observed in the front yards of the homes south of 26th Avenue. Some residents are probably aware of the prairie dog activity across the street and may have concerns about the transmission of plague or a perceived unsightliness of the area. Others may enjoy watching the prairie dogs and support the designation of a conservation area here.

With the development of the SDC property, traffic will increase along 26th Avenue and Moline Street. This may create an effective barrier to dispersal into adjacent residential properties.

The greatest conflict with this proposed designation is that most of the proposed conservation area is zoned residential. Establishment of a prairie dog conservation area beyond 15 acres would require a modification of the current zoning.

Recommendations

- Determine the feasibility of establishing a prairie dog conservation area on this site in the context of the Development Plan.
- If further consideration is warranted, invite the Friends of Bluff Lake to assist in formulating a plan for the creation of a prairie dog conservation area.
- Work with the Friends of Bluff Lake to integrate lessons and other information about black-tailed prairie dog ecology and management into their public programs.

Section III: Management Recommendations

Managing prairie dogs in the context of the adjacent land uses is one of the most complex issues of prairie dog management. This section provides guidelines for both designing prairie dog conservation areas on Stapleton open space and maintaining them for the long term. Maintaining and restoring native grasslands are not addressed specifically in this plan. No site-wide evaluation of the vegetation has been conducted to date. An analysis of the existing vegetation should be conducted to locate areas of locally unique or rare plant species and identify areas for reclamation. A plant ecologist or reclamation expert should be consulted to provide recommendations for reclamation specifications.

photo:George H Harrison/NWF

General Design Guidelines

In an urban setting, design guidelines are needed to reduce potential conflicts and to guide management actions. Most conflicts with prairie dog colonies are of two types: 1) conflicts with adjacent land uses and 2) conflicts between people and their pets and prairie dogs. Managing visitor use in prairie dog colonies will minimize conflicts. Establishing policies for human use before trails are constructed will minimize the conflicts as prairie dog conservation areas are developed and populated.

1. Consult with a plant ecologist or reclamation specialist to identify areas for reclamation and develop site specific recommendations, including areas where prairie dogs will not be allowed.

2. Provide perches for raptors. Perches should be placed away from areas of unpredictable human activity, e.g. trails. Monitor effectiveness of perch-poles using volunteers.

3. Design trails to skirt the conservation area for minimum impact to the colony. Do not bisect the conservation area with trails, particularly high-use trails. If trails must go through a prairie dog area, establish a "stay on trail" policy for humans and pets, both for human health reasons and impacts to prairie dogs. Consider use of crusher fine material for trail surface to reduce impacts to grasslands.

4. Limit presence of dogs in prairie dog areas. At a minimum, establish a "dog on leash" policy in conservation areas.

5. Provide interpretive materials on prairie dog ecology and their ecological value.

6. Provide interpretive materials regarding prairie dogs and plague, including steps that will be implemented when plague is found in the colony.

Design Guidelines for Boundary Management

In order to prevent prairie dogs from migrating into adjacent areas, several landscaping strategies can be used.

1. Plant the borders of the conservation area with tall grasses and shrubs, to discourage migration. Do not use lush grasses, i.e. Kentucky bluegrass.

2. Gradually increase the height of the vegetation and have denser areas of shrubs at the boundaries.

3. Design the adjacent areas so that common areas or roadways border conservation areas, rather than backyards.

4. Border the conservation area with a water feature.

5. Border the conservation area with roads.

6. Border the conservation area with low fencing or walls that obstruct prairie dog's line of sight. Plastic fencing 24" high is effective in situations where an existing colony is not being divided. It can be relatively unsightly in an urban setting, but can be used initially until landscaping is established.

Best Management Practices for Short-Term Habitat Disturbances

The following Best Management Practices apply to activities that are short-term in duration and are not intended to permanently destroy prairie dog habitat.

- Earth-moving equipment should progress through the area at as slow a rate as possible to avoid direct injury or mortality. The project should be completed as quickly as possible.

- Avoid activities in prairie dog colonies from March 1 to June 1.

- Concentrate activity around the periphery of prairie dog colonies when possible.
- A plant ecologist and wildlife biologist should be consulted prior to beginning the project and for post-project reclamation.
- Overall disturbance to the area where prairie dogs are located should be minimized.

Long-Term Management Issues

Plague

Prairie dogs are highly susceptible to plague and have developed no significant immunity to the disease. Plague is a recently introduced bacterial disease carried by fleas and is known to cause significant population decreases of prairie dogs over large areas. Historically, plague has eliminated small prairie dog colonies and significantly reduced populations in larger colonies. Prairie dogs do not have resistance to plague, but colonies remain because (1) their populations exist in relative isolation from each other, (2) their populations respond quickly from epizootics and (3) plague has rarely killed entire colonies. Plague vectors either do not find small isolated prairie dog colonies or do not traverse the landscape that separates the colonies. Prairie dogs from portions of colonies not exposed to the disease disperse to re-colonize vacated towns.

In a managed situation such as Stapleton, with a dense human population upon build-out, it is important to monitor preserves for presence of plague. The City and County of Denver Health Department monitors prairie dog areas three times per year for plague. The agency responsible for management of the parks and open space at Stapleton should monitor prairie dog conservation areas for plague on a monthly basis.

Management Response to Plague

When plague is suspected in an area, the area will be closed to human use. Educational signs will be posted at the boundaries and/or points of entry advising the users/neighbors of the presence of plague and explaining why humans and pets should not go into the area and precautions to take if they do enter the conservation area. The area should be monitored by the heath department for prairie dog mortality.

Despite the adverse effects of population declines, plague events afford opportunities for reclamation and/or revegetation and ultimately reintroduction of prairie dogs. When an area has been depopulated by plague, prairie dogs should not be reintroduced for at least one year, two years if possible, in order to make sure the plague bacteria is no longer viable. Depending on the proximity and connectivity of the area to other prairie dog colonies, some re-population may happen naturally during times of normal dispersal. A decision whether or not to prevent re-population of a particular site should occur on a case by case basis, taking current conditions into account.

Prairie Dog Population Control

For the majority of the prairie dog populations at Stapleton, non-lethal controls such as relocation will be considered first. Given the current status of the prairie dog (proposed listing as a threatened species) and the attendant publicity surrounding any management actions by public or quasi-public agencies, prairie dogs at SDC will not be exterminated when other options exist. Conservation groups and interested individuals will be contacted and advised of the situation and the lack of non-lethal alternatives.

The following hierarchy will be used to make decisions regarding prairie dog management.

1. If habitat protection *in situ* is not a viable option due to the development plan, non-lethal controls such as relocation will be considered first.

2. SDC will contact the Colorado Division of Wildlife District Wildlife Manager for a permit and work with appropriate relocation contractors to move prairie dogs within SDC-owned lands to areas determined to be suitable habitat.

3. SDC will contact other area agencies and/or landowners within Denver County to determine if they have sites for prairie dog relocation.

4. After all relocation possibilities have been exhausted, prairie dogs may be collected and sent to ferret-rearing facilities as ferret food.

5. SDC will use lethal controls as a last resort.

Relocation

Relocation Site Identification

Within current state regulations, relocation to sites on the SDC property and within Denver County will be the easiest to accomplish. The relocation permit from the Colorado Division of Wildlife is the only one required for within-property or county relocations. If at some point in the future, the RMA is accepting prairie dogs, relocation to that site might require the permission of the Adams County Commissioners in addition to the Colorado Division of Wildlife relocation permit.

Standards for Relocation

- **Reciprocal agreements** between organizations may be arranged.

- **Colony Size**. The minimum number of prairie dogs for relocation will be determined by standards agreed to by both the receiving site landowner and the relocation specialist. One study, conducted at the RMA, suggests that the minimum group size for relocation is 60 individuals; however, relocation experts will move smaller groups of animals.

- **Methods of relocation** to be used include burrow flushing with soapy water, live trapping and vacuuming/suctioning from burrows.

- **Timing**. Optimal times for prairie dog relocation are late summer and early fall, after the pups have emerged from the burrows and before winter. The prime months for relocation are June 1 through October 1, but relocation may be done in the winter depending on weather and the receiving site conditions (i.e. presence of existing burrows). By state regulation, prairie dog colonies cannot be relocated between March 1 and May 31.

- **Burrowing owls**. If burrowing owls are present in the colony, there can be no disturbance between March 1 and October 31 within a 150' zone around prairie dog burrows occupied by burrowing owls.

- **Black-Footed Ferret**. The Stapleton site is part of a larger area that has been designated as a "ferret free" area by the U.S. Fish and Wildlife Service (see Appendix 2), which means that rodenticides may be used in prairie dog colonies.

- **Relocators** must be licensed by the state and are required to adhere strictly to the Colorado Division of Wildlife permit requirements.

For federal and state regulatory issues related to relocation and extermination, see Appendix 5.

Best Management Practices for Relocation

The following Best Management Practices give guidance for specific relocation activities.

- Coteries or family units should be released together when possible.

- Vehicles and equipment used should be rubber-tired and efforts should be made to minimize disturbance. Skid steer vehicles should not be used.

- Holes must be dusted using SEVIN (carbaryl), PERMETHRIN (synthetic pyrethrin) or other appropriate insecticide for removal of fleas prior to flushing and trapping.

- Individual prairie dogs must be dusted with appropriate insecticide after capture.

- Prairie dogs should generally not be relocated into areas affected by the plague for approximately two years after the plague event. If prairie dogs must be relocated to an infected area in a shorter timeframe, precautions will be taken to minimize impacts of the plague infestation.

- Respirators must be worn when auguring holes or when working in close contact with the soil.

- Prairie dogs should be released on the new site as soon as possible, either the same day or the next. They should not be held more than 72 hours after capture.

- Prairie dogs from separate colonies should be placed as far apart as possible.

- No trapping or releasing should occur during inclement weather.

- Traps must be checked at least every two hours and more frequently during high temperatures.

- Traps should be covered with a towel or other cloth, as soon as possible after a capture. All efforts should be made to keep captured animals cool.

- After capture and before release, each individual should be treated to kill fleas to minimize the chances of disease transmission. Capture and relocation should occur on the same day, if possible, to reduce stress on the animals.

- Receiving sites should be previously occupied prairie dog towns whenever possible; however, until more data is collected, shortgrass prairies with augured holes may be used. An area 10 feet (radius) from each burrow entrance should be shortgrass prairie vegetation and appropriate for prairie dog relocation.

- The borders of the preserve should be evaluated for avenues of dispersal. Barriers, both natural and artificial, should be repaired or constructed to fit in with adjacent land uses.

Permits Required for Relocation

- The Colorado Division of Wildlife is preparing an administrative directive that outlines their requirements for relocating prairie dogs. A summary of the July 20, 1999 Draft Prairie Dog Relocation Permitting Procedure is included (Appendix 3). A permit is required for any prairie dog relocation activities, including trapping, flushing or vacuuming.

- Colorado State Senate Bill 99-11 requires the approval of the County Commissioners of the receiving county if prairie dogs are relocated between counties (Appendix 4).

Extermination

Extermination of prairie dogs may only be used when 1) no relocation sites are available, 2) no acceptable relocators are available, 3) relocation is unacceptable due to budgetary constraints, 4) collection of prairie dogs for use as ferret food is not practical or 5) all prairie dogs cannot be captured during a relocation (as required by the Colorado Division of Wildlife).

If relocation is not feasible, SDC will contact external animal protection groups before extermination is used. If SDC has determined that all non-lethal methods of control have been exhausted, it will consider use of lethal control. Only the most humane methods of lethal control will be used. SDC will use licensed pesticide applicators for extermination.

REFERENCES

City of Boulder. 1996. Black-Tailed Prairie Dog Habitat Conservation Plan. Open Space/Real Estate Department. Boulder, Colorado. 75pp. (*also used were various policies and management prescriptions prepared by the City of Boulder*).

Noss, R.F. and A.Y. Cooperrider. 1994. Saving Nature's Legacy: Protecting and Restoring Biodiversity. Defenders of Wildlife. Island Press. Washington, DC. 416 pp.

Stapleton Redevelopment Foundation et al.. 1995. Stapleton Development Plan. City and County of Denver and Citizen's Advisory Board Denver, Colorado.

United States Fish and Wildlife Service. 1996. Rocky Mountain Arsenal National Wildlife Refuge Comprehensive Management Plan. Commerce City, Colorado. 130pp.

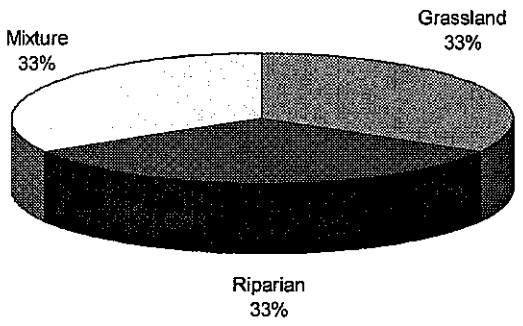
United States Fish and Wildlife Service. 1996. Rocky Mountain Arsenal National Wildlife Refuge Final Environmental Impact Statement 148pp.

Appendix 1: Methodology

Habitat Assessment Criteria

Filter One: Cultural Suitability

Approximately 65% of the SDC site (about 3,000 acres) is to be sold for residential or commercial development. Land available for prairie dog habitat, must be drawn from that portion of the remaining 1,116 acres of Open Space that is suitable and without other constraints.



Open Space Land Uses

The development plan anticipates that in addition to regional open space (1,116 acres) there will also be approximately 400 acres of open space within the various proposed neighborhoods. This neighborhood open space would include parks, parkways and recreation facilities on small parcels. For the purpose of this plan, neighborhood open space parcels are considered incompatible with prairie dog habitat conservation efforts, therefore, we examined only the regional open space for potential prairie dog habitat. According to the plan, the 1,116 acres of regional open space will be divided roughly into thirds as follows: one third grassland, one third riparian corridor and one third a mix of the other managed landscape types such as traditional parkland, highway frontage, agricultural land and infrastructure. Between 150 and 210 acres of the grassland is expected to be dedicated to golf course development. The golf course will be designed to fit into the restored sand hill prairie landscape, but will still effectively reduce acreage available for prairie dog habitat within the grassland portions of the site. The result of the application of the cultural suitability filter is that roughly 200 acres of land have the potential to be prairie dog habitat before any ecological suitability assessment. (See filter two). More than 90% of this potentially suitable habitat lies north of I-70.

Another small-scale cultural factor was identified during site analysis. Denver Water has an agreement with the Stapleton Development Corporation to construct two underground reservoirs on the site. These reservoirs will be built on the open space lands at locations yet to be determined. One of the reservoirs is to contain potable water and no surface uses, *including occupation by prairie dogs,* are allowed. The total surface acreage for both reservoirs is 25 acres. This suitability factor was *not* used as part of the analysis, because as of this writing the location of the reservoirs had not yet been determined.

Cultural suitability is also dependent upon the absence of leases, easements, rights of way or other outstanding real property interest that might preclude management of a property

for prairie dog habitat conservation. The Stapleton Development Corporation should research land ownership records to insure that there are no other transfers of real property interest (e.g. leases, easements, etc.) which would prohibit the establishment of prairie dog conservation areas in otherwise suitable habitat. SDC staff should also determine if any ordinances, policies or special rules/regulations of the City and County of Denver or of SDC itself, would restrict or prohibit the establishment of prairie dog conservation areas.

Filter Two: Ecological Suitability

We used a vegetation-based filter to assess the gross ecological suitability of potential habitat (i.e. those lands that survived the cultural suitability filter. See figure 6). Within the areas of potential habitat, almost all upland areas are considered ecologically suitable habitat. A patch of remnant sandhill prairie has been identified in the southeast corner of Section 10. This prairie island lies in an area slated for development and as such, was categorized as culturally unsuitable. SDC has chosen to consider this area as ecologically unsuitable because of the great value of the site in a relatively undisturbed condition. Wetlands and riparian areas associated with Sand Creek and Westerly Creek are considered ecologically unsuitable habitat for prairie dogs because of seasonally high ground water, and the presence of dense, tall and woody vegetation.

Occupied Habitat. The coarse filter analysis provides information about where prairie dogs are anticipated, but knowledge of where they are actually known to live is also important. In 1999, SDC staff mapped the location the prairie dog colonies on site. A similar effort was undertaken by the prospective development partners of SDC (Forest City Inc.). Forest City contracted with ERO Resources to map the locations of active towns on the site. In addition, the US Fish and Wildlife Service (USFWS) has conducted annual mapping of active prairie dog colonies at the Rocky Mountain Arsenal National Wildlife Refuge (RMA) for many years. Although USFWS mapping is typically restricted to the RMA, prairie dog populations in the northeast corner of the Stapleton

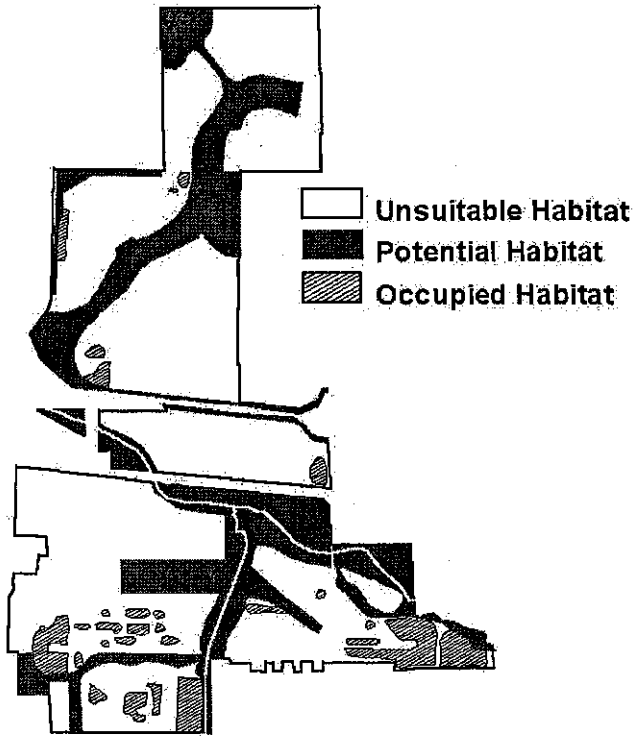


Figure 6: Results of Filter One: Cultural Suitability

site were mapped in 1998. The mapping from these three sources is summarized and plotted in relationship to habitat suitability. Most prairie dog activity is located within the development zone areas as unsuitable habitat (figure 6).

Suitable Habitat within Habitat Blocks

The vegetation-based coarse filter used to derive the blocks of suitable habitat generalizes the landscape. It is possible that not all the land within the blocks of potential habitat is truly suitable for prairie dogs.

Models of black-tailed prairie dog habitat consider the following factors as the best predictors of habitat suitability:

- Size of the area,
- Height of vegetation
- Percent herbaceous cover,
- Soil type
- Slope

Absolute minimum habitat area size is based upon observations that the area used by a single-family unit averaged 0.61 acres. The survival of relocated populations of black-tailed prairie dogs seems to be tied to group size. Recommended group size for relocation is approximately 60 individuals. While very small colonies may persist and support some populations of prairie dog dependent species, tiny colonies probably have limited ecological function. Furthermore, the long-term viability of very small colonies is thought to be quite low (see discussion of colony size below). *Small parcels were not identified as a result of the coarse filter analysis.*

According to the habitat model, optimal vegetation height for prairie dog habitat is between two and 10 inches. David B. Seery, wildlife biologist at the RMA, has suggested that a vegetation height value less than eight inches is probably optimal under local conditions. Since prairie dogs can keep areas clipped, one option may be to mow areas to either attract prairie dogs to the site or to prepare a receiving site for prairie dogs relocated from elsewhere.

Herbaceous cover from 30% to 90% is optimal in the standard model of prairie dog habitat suitability. Herbaceous cover refers to the percent of ground covered by living plants. Below 30%, soil erosion can become a concern. The composition of vegetative cover is also important for ecological sustainability of the surrounding grasslands. A combination of weedy broad-leaved plants and cheatgrass is the most common cover type for prairie dog towns at the RMA. A preferable situation would be to have prairie dogs inhabiting grasslands dominated by native species.

No information is available for the project area to permit analysis of herbaceous cover or vegetation height. However, vegetation composition and height were measured in the field at potential conservation areas. These areas are dominated by weeds and in places

exhibit lower than optimal cover and higher than optimal vegetation height. It will be necessary to implement reclamation before or during the establishment of prairie dogs.

The standard habitat model considers soil texture with sand contents greater than 70% unsuitable for prairie dog habitat. Data are available from the RMA to analyze the relationship between prairie dog distribution and soil type. Analysis of this information indicates that prairie dogs are widespread, occurring even on soils identified as loamy sands—where sand content can range up over 81%.

No information is available to permit analysis of soil texture at Stapleton. It is likely that soil information would be contained in the geo-technical analyses conducted before runway construction. Soils were examined in the field at potential conservation areas. In the areas sampled, the identified conservation areas exhibited suitable soil textures.

The habitat model indicates that prairie dogs avoid slopes greater than 20% and prefer slopes less than 10%. While prairie dogs may show a preference for flatter terrain, they probably will not completely avoid steep areas. The existing condition of the study area is quite flat, and slopes are generally less than 10% throughout. We did not conduct an evaluation of slope in potential habitat; however, slope was measured at each potential conservation area. No slopes over 10% were identified. Future site grading may alter the suitability of habitat in some areas by creating steeper slopes than currently exist.

Principles of Preserve Design

Vegetation, slope and soil texture can inform us about where a prairie dog will find environmental conditions suitable for existence. Direct observation tells us where the prairie dogs can be found. However, other information is needed to design conservation areas that will provide for long-term survival of a population. Conservation biology provides several general principles of preserve design.

1. Species well distributed across their native range are less susceptible to extinction than species confined to small portions of their range.

2. Large blocks of habitat containing large populations are superior to small blocks of habitat containing small populations.

3. Habitat in contiguous blocks is better than fragmented habitat.

4. Blocks of habitat close together are better than blocks far apart.

5. Interconnected blocks of habitat are better than isolated blocks and emigrating individuals travel more easily through habitat resembling that preferred by the species in question.

Range-wide Conservation of the Black-Tailed Prairie Dog

Large habitat blocks with large populations

Large habitat blocks with large populations are superior to small blocks with small populations. Larger habitat blocks provide more area for prairie dogs and larger populations have a smaller chance of dying off due to random environmental events. Larger blocks also tend to have less edge than a collection of many fragmented blocks and therefore fewer opportunities for conflict with neighbors. These large areas also have prey populations and land areas more likely to attract and sustain predators with large home range sizes (e.g. coyotes, raptors and badgers).

Working with the results of the coarse filter analysis we focused our recommendations for conservation areas on large habitat blocks.

Contiguous habitat blocks vs. Fragmented blocks

Fragmentation is used here to describe a condition where once-continuous habitat is separated into pieces that are completely or practically isolated from each other. Urban, agricultural, commercial and residential land uses in the Denver metropolitan area have resulted in a patchwork of grassland remnants (mostly large government properties) separated by large expanses of unsuitable habitat.

One large grassland remnant is the Rocky Mountain Arsenal, which is immediately adjacent to the northern boundaries of the project area. This 27-square mile (>17,000 acre) facility is being managed under an Environmental Impact Statement approved in 1995. Under this EIS, grassland conservation is a dominant focus and black-tailed prairie dogs receive special attention as a species of special concern. We have had preliminary discussions with RMA officials about locating a prairie dog conservation area along the common boundary. The initial response from the RMA staff has been favorable.

We have investigated opportunities to establish large continuous habitat blocks and our recommendations take advantage of such opportunities where they exist. Locating a prairie dog habitat area in the northern portion of Section 10 would complement the efforts at the RMA and increase the likelihood of long-term success for SDC's prairie dog conservation effort. If a formal agreement could be reached with the USFWS, establishing a prairie dog conservation area in Section 10 would also reduce the potential for conflicts between prairie dog conservation efforts and neighboring land uses.

Proximity of habitat blocks

Habitat blocks close to each other allow for a greater likelihood of migration among populations. Migrating individuals can provide increased genetic diversity, reducing the likelihood that a population will decline because of inbreeding. Migrating prairie dogs can also help recover populations that are in decline from random environmental factors

(high predation rates, disease, localized flooding, etc.). Given the relatively small size of the project area and the small number of large areas of suitable habitat, it may not be realistic to envision many conservation areas at Stapleton. Therefore, between-site proximity may not be an issue. The presence of other populations on adjacent lands such as the RMA may be important for augmenting the genetic diversity of colonies and helping maintain population levels during periodic declines.

We have recommended the establishment of multiple conservation areas and have factored in the role that prairie dog populations at the RMA may play in sustainability of prairie dogs at Stapleton.

Interconnected habitat blocks

Interconnected blocks of habitat are better than isolated blocks. Migrating individuals travel more easily through suitable habitat. As stated above, connections among habitat blocks provide opportunities for (1) the continuous exchange of genetic information and (2) a colony to be re-established in case of a population decline. Prairie dogs can disperse over distances of up to three miles and over inhospitable terrain. They are more vulnerable to predation and other sources of mortality during dispersal. Prairie dogs have been observed successfully crossing busy highways and wetlands, as well as swimming in irrigation ditches and creeks. At Stapleton, urban development, roads, unsuitable natural habitats, water bodies and other obstructions will separate blocks of suitable prairie dog habitat from each other. These discontinuities will impede the dispersal of prairie dogs among habitat blocks. Although individuals may successfully traverse inhospitable terrain, dispersal rates will probably be low and not of biological significance.

We have recommended boundaries that maintain the habitat areas as intact units in the context of the development plan.

Appendix 2: USFWS Black-footed Ferret Clearance

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
P.O. Box 25486 DFC
Denver, Colorado 80225-0207
Phone: (303) 275-2370 Fax: (303) 275-2371

IN REPLY REFER TO:

ES/CO: Block Clearance
Mail Stop 65412

AUG 20 1999

Mr. Mark Gershman
650 Hawthorne Avenue
Boulder, Colorado 80304

Dear Mr. Gershman:

You contacted this office by phone on August 18, 1999 requesting information concerning the area around the Denver Metro area that the Service has designated as "ferret free". This designation refers to areas that have been determined to no longer support populations of the endangered black-footed ferret due to human disturbance and development. To answer your question, please find enclosed a map of the area that has been designated as block-cleared within the Denver Metropolitan Area. The old Stapleton Airport area falls within this block-cleared area.

If you should have further questions about this, please contact Clay Ronish of my staff at (303) 275-2370.

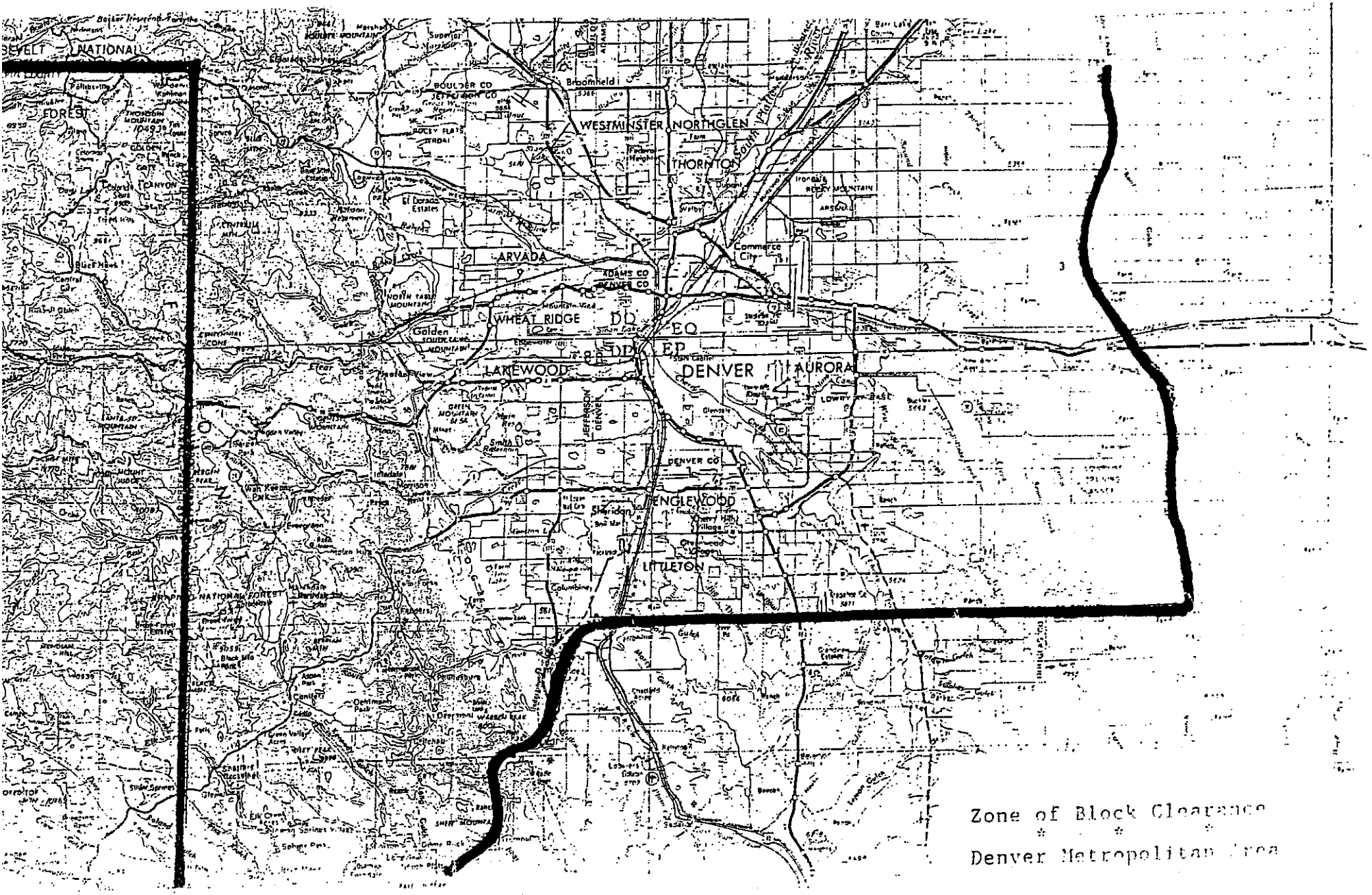
Sincerely,

Clayton R. Ronish

For LeRoy W. Carlson
Colorado Field Supervisor

Enclosure

cc: Reading File
Project File


WESTMINSTER
NORTHGLEN
THORNTON
ARVADA
WHEAT RIDGE
LAKEWOOD
DENVER
AURORA
ENGLEWOOD
LITTLETON
Golden
Broomfield
Commerce City
Zone of Block Clearance
Denver Metropolitan Area

Appendix 3: Summary of the July 20, 1999 Draft Prairie Dog Relocation Permitting Procedures of the Colorado Divison of Natural Resources

Summary of the July 20, 1999 Draft Prairie Dog Relocation Permitting Procedures of the Colorado Division of Wildlife

Who	District Wildlife Manager and Area Terrestrial Wildlife Biologist of the sending and receiving sites must review and approve plans. Regional Manager or Assistant Regional Manager of the receiving site must approve plans. For transfers between counties, the Board of County Commissioners must also approve the project.
When	Any time of year, however relocation is discouraged during the months of March, April, and May. Permits are good for a maximum of 120 days.
What	Three documents are required, 1) an application, 2) a management plan for the receiving site and 3) a report about the project. See table below for contents of these three documents. Review of application precedes requirement for management plan.
Where	Anywhere within the state of Colorado.
How	Burrow flushing, live trapping or vacuum extraction. Other methods may be allowed with special permitting.

- *Application Requirements*

I. Overview
   a) Date
   b) Names/contact information for proponents
   c) Proposed capture sites/ownership
   d) Proposed release sites/ownership
   e) Number of prairie dogs to be relocated
   f) Dates of proposed relocation

II. Release Site Description
   a) Suitability
      i) Site capacity
         (a) Size of property
         (b) Shape/configuration of property
      ii) Vegetation
         (a) Short-grass prairie?
         (b) Further description of vegetation
         (c) Percent cover by vegetation
      iii) Is vegetation > 2" and < 12"? If higher, can it be mowed?
      iv) Does the site show signs of degradation or disturbance?
      v) Soil type < 70% sand?
      vi) Topography
         (a) Slope< 20% grade
         (b) Describe topography
      vii) Barriers that may limit the dispersal of prairie dogs (steep slopes, wetlands, creeks, ditches, tall vegetation, busy roads).

b) Presence of Prairie Dogs
   i) History of the prairie dog population on the property.
   ii) Current habitation
      (a) most recent plague outbreak
      (b) Species
      (c) Percent of site covered by burrows
      (d) Percent of burrows occupied
      (e) Location of are occupied burrows
      (f) Population trend
   ii) Location of nearest prairie dog town of same species
   iii) Likelihood of prairie dog migration between towns

c) Presence of wildlife associated with prairie dogs
   i) Any known associated species (e.g. burrowing owls, golden eagles, ferruginous hawks, mountain plover, kit fox, rabbits, snakes)
   ii) What other wildlife are known from the area or likely to occur there?

d) Land Use
   i) What management plans or other legal documents guide the uses of the property?
   ii) Current Land Use
   iii) Future Land Use
   iv) Adjacent land use

e) Social Considerations (perceptions, conflict, support, etc.)

• *Management Plan*

III. The Management Plan is considered Part III of the application.
   a) Site Preparation: Describe how the release site will be prepared.
   b) Population Management: Estimate carrying capacity and describe strategies for monitoring and managing prairie dog populations.
   c) Impacts/Mitigation
      i) potential conflicts/concerns
      ii) strategies to mitigate conflicts
      iii) Notification of neighboring landowners (standard referral forms provided)
   d) Social Considerations: Assess community support for project.
   e) Relocation Project Benefits: Describe what the potential benefits of the project may be.

• *Project Report*

The Project Proponent must submit a project report to the release site District Wildlife Manager within 15 days after the expiration of the Permit. Failure to complete project reports may result in denial of future proposals.

No details are provided.

Appendix 4: Colorado State Statute 35-7-203

35-7-203 - Release of destructive rodent pests - definitions.

(1) No person shall release destructive rodent pests into a county unless such person has complied with all requirements for such release imposed by the wildlife commission and obtained both the prior approval of the commission and the prior approval, by resolution duly adopted, of the board of county commissioners of such county. A person need not obtain such prior approval before:

(a) Transporting destructive rodent pests through a county without releasing such destructive rodent pests; or

(b) Confining destructive rodent pests indoors or in cages or similar enclosures and using such destructive rodent pests for scientific purposes or as food for human or animal consumption; or

(c) Keeping destructive rodent pests indoors or in cages or similar enclosures as pets; or

(d) Releasing destructive rodent pests into the county in which such destructive rodent pests were originally taken into captivity.

(2) For purposes of this section, "destructive rodent pests" means one or more rodents, including but not limited to prairie dogs, ground squirrels, pocket gophers, jackrabbits, and rats, that pose a threat to agricultural, horticultural, or livestock concerns or to human health.

(3) The board of county commissioners of any county into which a person releases destructive rodent pests without the prior approval of such board may, at its discretion:

(a) Require the person who released the destructive rodent pests to eradicate the destructive rodent pests or remove the destructive rodent pests from the county; or

(b) Impose a fine upon the person who released the destructive rodent pests in an amount sufficient to compensate the county for the cost of eradicating the destructive rodent pests or removing the destructive rodent pests from the county.

Appendix 5: Regulatory Issues

A number of legal issues are related to prairie dog management on the SDC site. These include both federal and state laws and regulations.

Federal

- **The Federal Insecticide, Fungicide, and Rodenticide Act** (FIFRA- 7 U.S.C. §§ 136-136y) applies to the use of certain rodenticides. Applicators of these restricted use pesticides must be certified by the Environmental Protection Agency or the Colorado Department of Agriculture. Furthermore application of restricted use pesticides triggers the consultation provisions of the **Endangered Species Act of 1973** (16 U.S.C. §§ 1531 et seq). As a result of this regulatory link, a survey for the federally endangered black-footed ferret (*Mustela nigripes*) must be conducted prior to the application of restricted use pesticides. Alternatively, an entire area may be "cleared" from the requirement for a survey based upon general habitat suitability factors. Because of the Denver area block clearance, no black footed ferret survey is required for the SDC site.

- On July 30, 1998 the National Wildlife Federation (NWF) petitioned the U.S. Fish and Wildlife Service (the Service) to emergency list the black-tailed prairie dog as threatened throughout its range under the provision of the **Endangered Species Act of 1973** (16 U.S.C. §§ 1531 et seq.). The NWF stated the emergency need was due to unregulated shooting and poisoning of prairie dogs that would occur during the Service's 12-month listing evaluation process. By law, the Service was compelled to respond to the petition within 90 calendar days. In September 1998, the Service responded to the NWF that although it did not believe the threshold had been met for emergency listing the black-tailed prairie dog, listing the species might be warranted and they would further evaluate the petition. On March 23, 1999 a positive 90-day finding for the petition was announced (USFWS 1999). This action initiated a 9-month review process for the petition. A listing decision from the Service is expected sometime in January 2000.

  If the black-tailed prairie dog were to be listed as a threatened species, the range of management options for SDC would be greatly reduced. It is possible that the development potential for occupied and possibly even vacant habitat would be reduced or eliminated. At this time, there is no guarantee and little reason to believe that this or any management plan would lessen the impact of a listing upon management options or development potential.

State

- The Colorado Division of Wildlife (CDOW) is responsible for the management of all animals within the state. Prairie dogs are classified as small game by the CDOW, and a hunting license is required to take prairie dogs (when hunting on the property of others). There is no limit to the number of prairie dogs that may

be taken (other than a special provision limiting the number to 5 in contests). Prairie dogs may be taken year round and in any legal manner.

- The CDOW also regulates the capture and relocation of living prairie dogs. A comprehensive administrative directive outlining the procedures to be followed during relocation is currently in draft form. It is summarized in appendix 3.
- The Colorado Department of Agriculture and the CSU Agricultural Extension assist landowners in the poisoning of prairie dogs. They provide technical assistance, access to control agents, and certify commercial rodenticide applicators.
- The Department of Agriculture also administers statutes associated with the formation of rodent control districts (C.R.S. 35-7-101). Under these regulations districts may be formed wherein control of prairie dogs (or other species) is required. Failure of landowner to control prairie dogs can result in Department of Agriculture (or its agents) entering the property to effect control.
- Colorado State Senate Bill 99-111 (codified as C.R.S. 35-7-203) requires that the Board of County Commissioners in the receiving county approve any proposal to relocate prairie dogs from outside their county. (Appendix 4)
- An amendment to the Colorado Constitution (0-4-283, XVIII, Section 13) prohibits the taking of wildlife by trap or poison. The taking of rodents, including prairie dogs, is specifically allowed. However, incidental take of non-rodent animals (e.g. burrowing owls, snakes, salamanders, frogs and toads) associated with prairie dog poisoning may be a violation of this constitutional provision. The City of Lakewood was forced to cease prairie dog poisoning on its Greenbelt when a district court judge issued a temporary injunction.